

Jan. 16, 1940.

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2,187,190

MACHINE FOR APPLYING CLOSURES OF THIN FLEXIBLE MATERIAL TO CONTAINERS

Filed Dec. 1, 1937

5 Sheets-Sheet 1

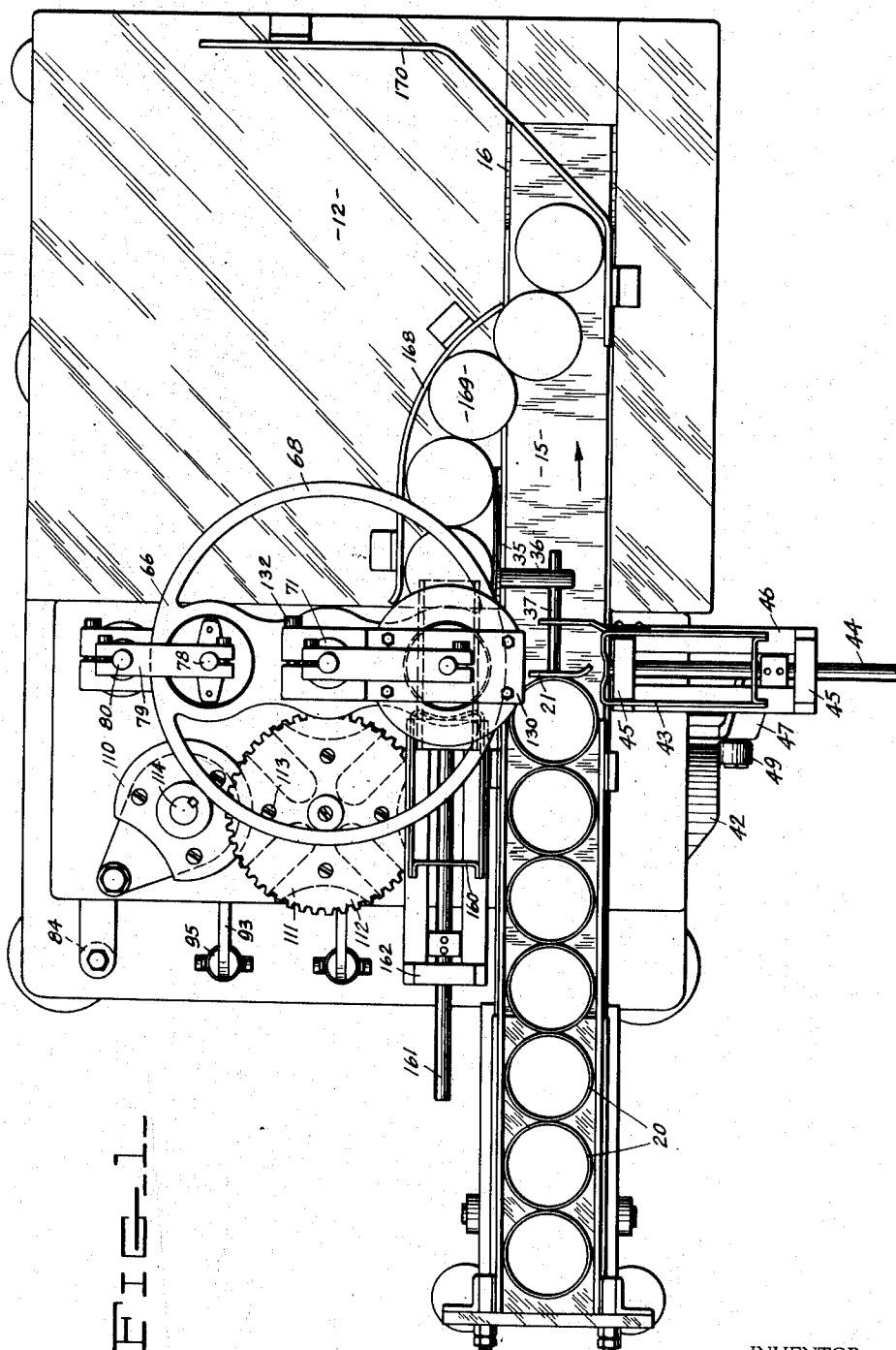


FIG. 1

BY

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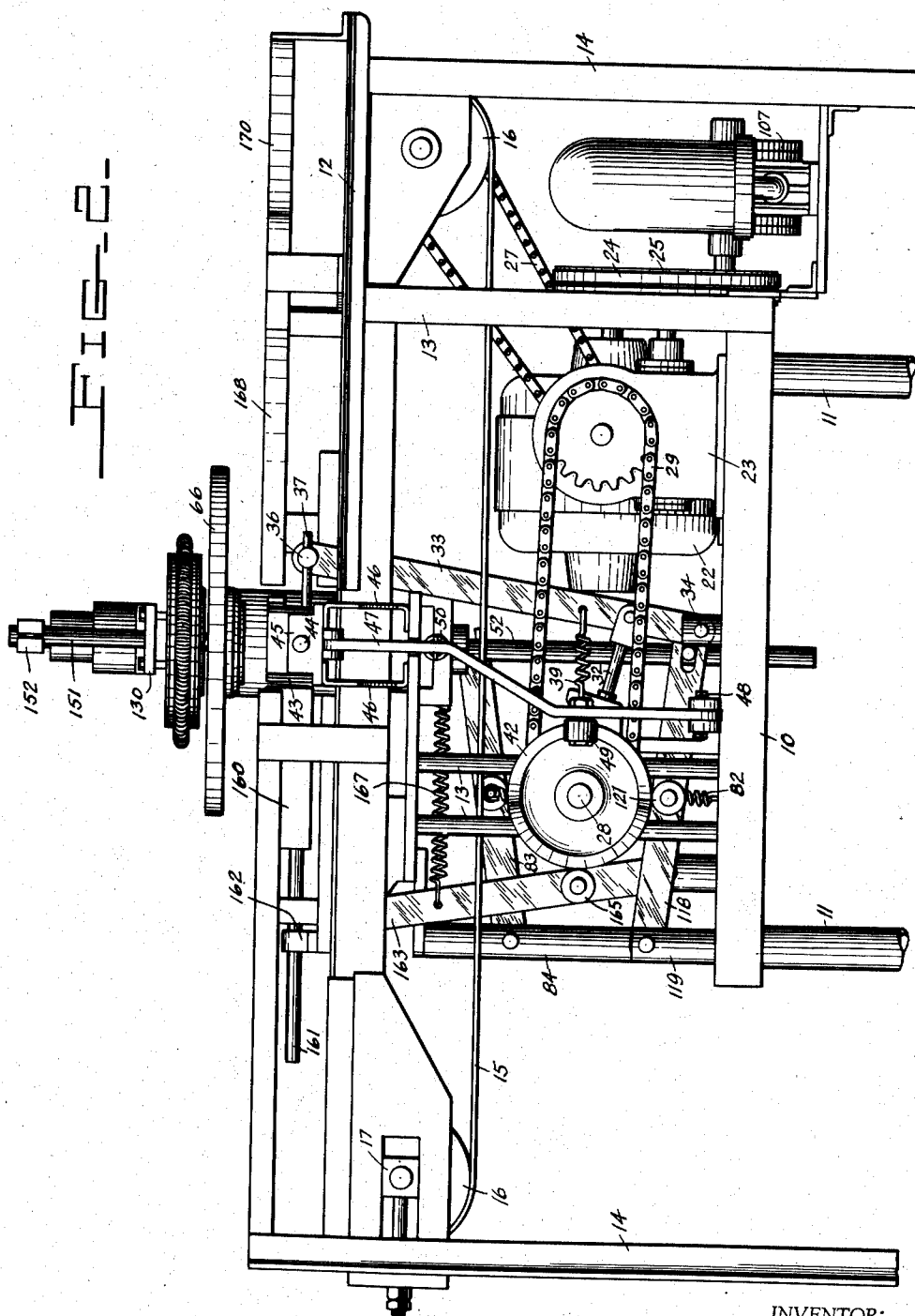
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MACHINE FOR APPLYING CLOSURES OF THIN FLEXIBLE MATERIAL TO CONTAINERS

Filed Dec. 1, 1937

5 Sheets-Sheet 2



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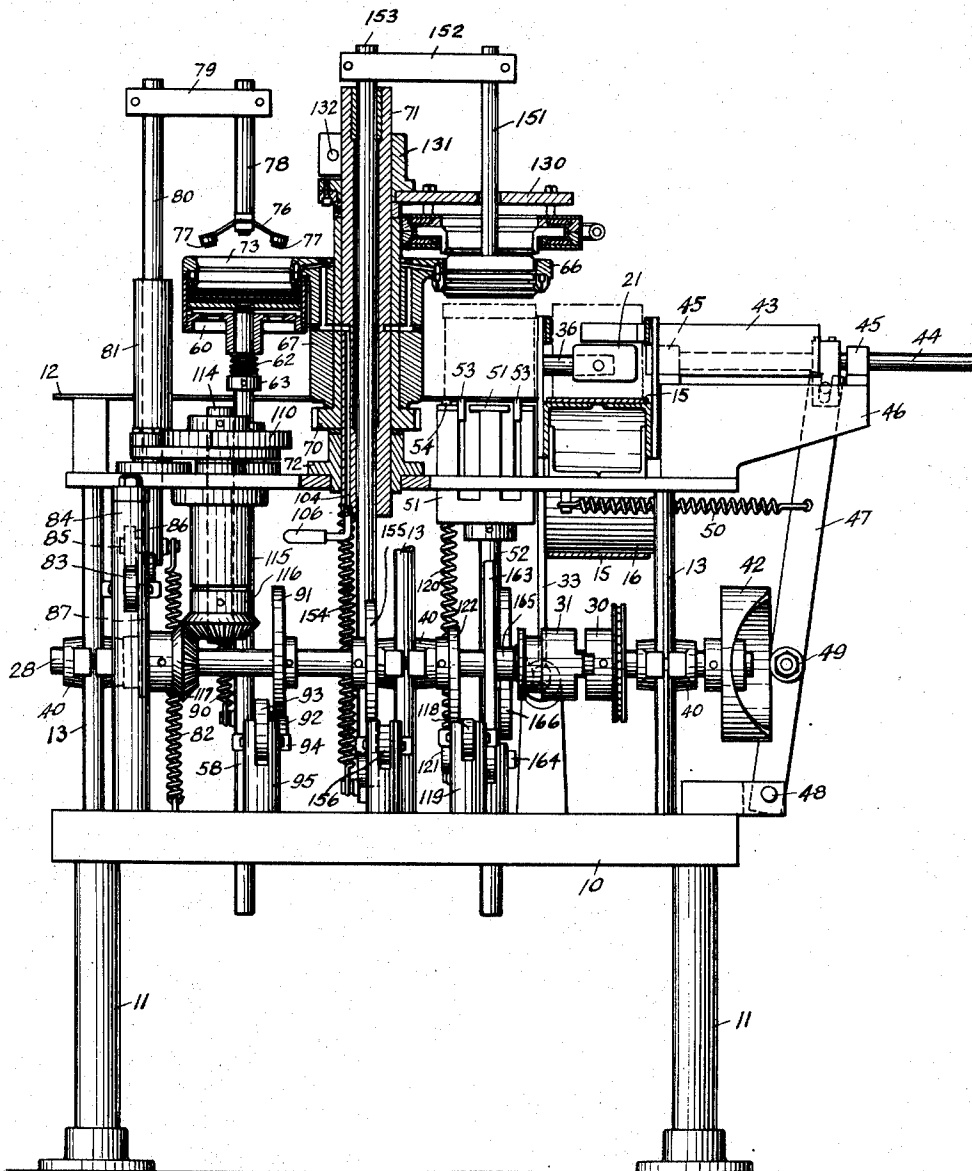
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MACHINE FOR APPLYING CLOSURES OF THIN FLEXIBLE MATERIAL TO CONTAINERS

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5 Sheets-Sheet 3

FIG. 3.



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MACHINE FOR APPLYING CLOSURES OF THIN FLEXIBLE MATERIAL TO CONTAINERS

Filed Dec. 1, 1937

5 Sheets-Sheet 5

FIG-7

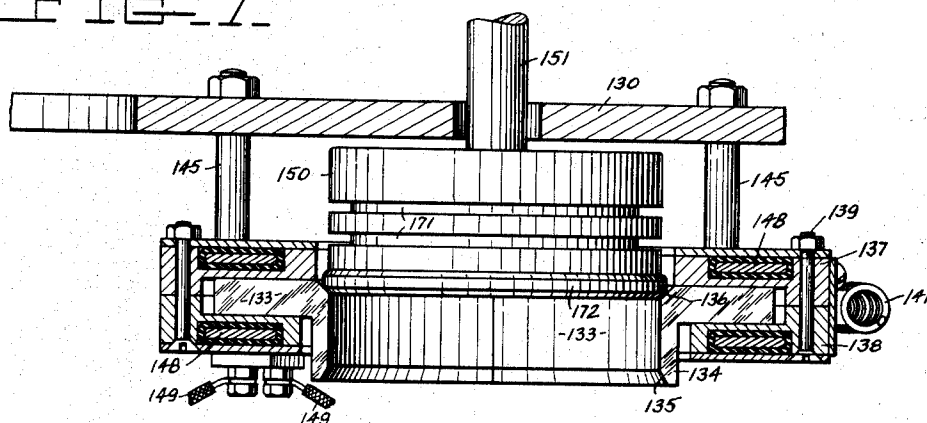


FIG. 8.

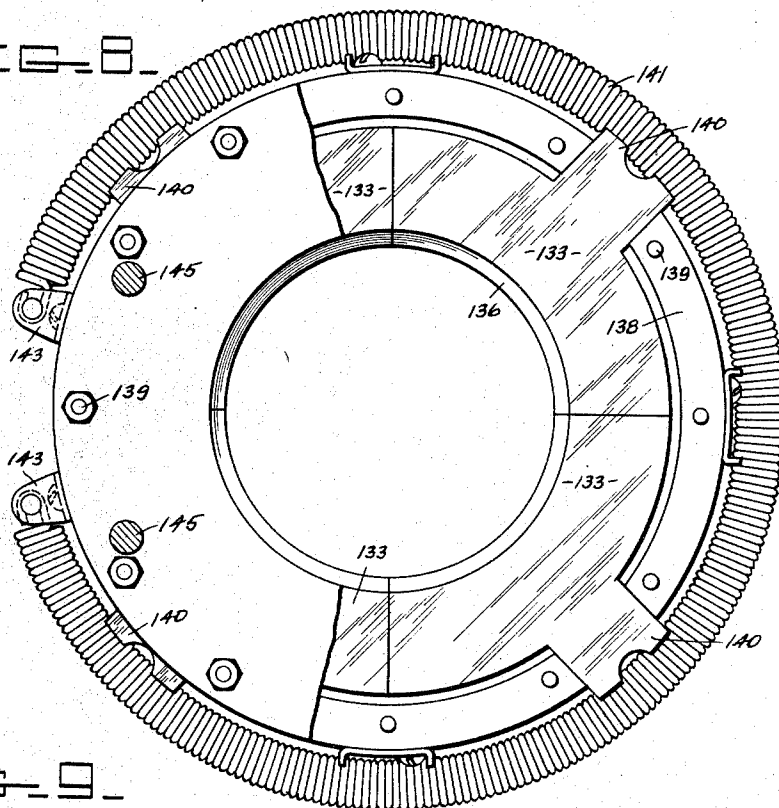
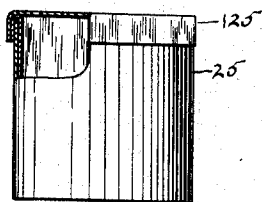


FIG-9.



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UNITED STATES PATENT OFFICE

2,187,190

MACHINE FOR APPLYING CLOSURES OF THIN FLEXIBLE MATERIAL TO CONTAINERS

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Application December 1, 1937, Serial No. 177,582

8 Claims. (Cl. 226—86)

This invention relates to machines for applying disk closures to containers, and more particularly to a machine for applying closures made of thin, flexible material, such as Cellophane, and sealing the closures to the containers.

The invention has as an object a machine of the type referred to embodying a particularly simple, compact and economical structure by which the containers are automatically fed into the machine and the disk closure applied and sealed to the container.

The invention has as a further object a structure embodying means whereby the disk closures may be arranged in the machine in stack formation, the disks being separately removed from the stack, transferred in juxtaposition to the containers and subsequently applied and sealed thereto.

The invention has as a further object a particularly simple and efficient means for preliminarily separating or buckling the top disk in the stack formation preparatory to its removal from the stack and its transfer to the container.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a top plan view of a machine embodying my invention.

Figure 2 is a side elevational view of the machine shown in Figure 1.

Figure 3 is a central sectional view of the machine.

Figure 4 is an enlarged fragmentary sectional view of the stack supporting mechanism, sheet buckling means and contiguous portion of the disk transfer member illustrating the sheet buckling means in operative position.

Figure 5 is a view, similar to Figure 4, with the sheet buckling means in inoperative position and illustrating the transfer of the top sheet of the stack to the transfer plate.

Figure 6 is a fragmentary sectional view taken on lines 6—6, Figure 5.

Figure 7 is a vertical sectional view of the sealing head.

Figure 8 is a top plan view of the sealing head with parts broken away.

Figure 9 is a side elevational view, partly in section, of one of the sealed containers.

The machine comprises a bed plate 10 supported by a plurality of posts or columns 11 and

a deck plate 12 arranged above the bed plate 10 and supported by a plurality of posts 13 attached to the bed plate and being supported at its ends by legs 14 extending downwardly to the floor.

A conveyor belt 15 is arranged along one side of the deck or top plate 12 and operates over drums 16 journaled at each end of the top structure, one of the drums being mounted in adjustable bearings 17 to effect proper tension of the conveyor belt 15. The conveyor belt moves in the direction of the arrow Figure 1.

The containers 20 are placed on the left end of the conveyor 15 Figure 1, and are moved forwardly until they engage with a plate 21 forming part of an operating mechanism for the clutch which connects the operating parts of the machine with a motor 22. The motor 22 is mounted on the bed plate 10 and is connected to or provided with a speed reducing device 23. As here shown, the motor 22 is connected to the speed reducing device by belts 24 trained over a pulley 25. The driven shaft 26 of the speed reducing device is connected to the conveyor 15 by means of chain 27, and also connected to a main shaft 28 by chain 29 operable over a sprocket secured to the clutch section 30 freely mounted on shaft 28 and held from endwise movement.

The movable section 31 of the clutch is slidably connected to the shaft 28 and is controlled by a rod 32 pivotally connected to a bar 33. The bar 33 is pivotally mounted at 34 to the bed plate 10 and extends upwardly through a slot 35 in the top plate 12, and is connected to the plate 21 by rods 36, 37. The clutch is normally in disengaged position as shown in Figure 3, at which time the lever 33 is maintained yieldingly in forward position by spring 39, see Figure 2. As the containers 20 are moved to the right Figure 1, they engage the plate 21 moving the lever 33 rearwardly about its pivot 34 effecting an engagement of the clutch. The clutch is of the one revolution type, and a single revolution of the shaft 28 effects operation of the machine through a cycle. The shaft is journaled in bearings 40 adjustably mounted on post 13.

The shaft 28 is provided at one end with a cylindrical cam 42. The cam 42 operates mechanism to move the container 20, which has just previously engaged the plate 21 and operated the clutch, inwardly off from the conveyor belt 15. This mechanism comprises a U shaped plate 43 secured to a shaft 44 slidably mounted in blocks 45 carried by a bracket 46 secured to the top plate 12 and extending outwardly from the

side of the machine. The shaft 44 and plate 43 are reciprocated by a lever 47 pivoted at its lower end to the base plate 10, as at 48, and being pivotally connected at its upper end to the shaft 44. The lever 47 is provided with a roller 49 arranged to engage the outer edge of the cylindrical cam 42. The lever 47 is urged outwardly by the high portion of the cam 42 and yieldingly urged inwardly by a spring 50. Upon rotation of the shaft 28 and cam 42, lever 47 together with shaft 44 and plate 43 are moved inwardly by spring 50, and the container is moved inwardly onto a container support 51 secured to the upper end of a rod 52 slidably mounted in the base plate 10.

The container support 51 is formed with slots to receive rails 53 fixed in spaced apart relationship in the top plate 12 and extending parallel with the conveyor belt 15 with the upper edges of the rails flush with the upper run of the belt 15. The top surface of the inner side of the container support 51 is provided with two spaced apart projections 54. The shaft 52 is reciprocated vertically, and the mechanism that effects this movement is so timed relative to the position of cam 42 that the top surface of the container support 51 is arranged flush with the upper edges of the rails 53 during the inward movement of the plate 43. That is, the projections 54 are positioned in the path of the movement of the container 20 by the plate 43, and the function of the projections 54 is to locate the container in a predetermined position on the container support. After the closure has been secured to the top of the container, the container support 51 is moved downwardly to the position shown in Figure 3, with the top surface of the container support below the top edges of the rails 53 and the tops of the projections 54 flush with the top edges of the rails 53. Additional mechanism, to be hereinafter described, is then subsequently operable to move the closed container to the right in Figure 1 off from the container support 51.

As here shown, the closures consist of separate sheets or disks arranged in a stack formation 56 positioned on a disk 57 secured to the upper end of a shaft 58 also slidably mounted in the frame of the machine for vertical movement. The stack formation 56 is encircled by a cup member 59, the bottom portion 60 of which is arranged beneath the disk 57 and includes a hub portion 61 slidably mounted upon shaft 58. The cup member 59 is yieldingly held upwardly in engagement with the disk 57 by a helical compression spring 62, the lower end of which abuts against a collar 63 secured to the shaft 58. The side wall of the cup member 59 is provided with a plurality of axially extending slots 64 for convenience of inserting and removing the stack formation 56.

Transfer mechanism is provided for selecting the topmost disk of the stack formation and transferring the same to a position over the top of the container 20 resting upon the container support 51.

As here shown, this transfer mechanism includes a plate member 66 journaled on a vertical axis intermediate the stack formation and the container support 51. The plate 66 is formed with a depending hub portion 67 and with a plurality of radially extending arms. In the structure here shown, the plate is formed with two arms, the outer ends of which are connected by an arcuate portion 68 which acts in the nature of a guard during rotation of the plate to lessen

the likelihood of injury to the operator. The hub portion 67 is mounted on and secured to a sleeve 69, the lower end of which is provided with an integral gear 70. The sleeve 69 is rotatably mounted on a tubular member 71, the lower end of which extends through a flanged member 72 to which it is secured by a shrink or press fit. The flange 72 is bolted, or otherwise firmly secured, to the top plate 12. The sleeve 69 extends upwardly beyond the top surface of the plate 66, and the tubular member 71 extends upwardly an appreciable distance beyond the upper end of the sleeve 69.

The outer end of each arm is formed with a circular aperture 73, and the lower marginal surface about the aperture 73 is recessed to receive an annular member 74, see Figures 4 and 5, which is secured in place as by screws 75. The plate 66 is so formed that the apertures 73 are arranged in axial alignment with the stack formation 56 and with the container arranged on the container support 51. When the stack support is in down position, as shown in Figure 5, and the container support 51 is also in down position, as shown in Figure 3, the arms of the transfer plate 66 pass over the stack formation and the top of the container when the transfer plate is rotated about the tubular member 71. The plate 66 is intermittently rotated, and with the plate provided with two diagonally arranged arms as here shown, the rotation is through an arc of 180°. Mechanism is provided for frictionally securing the topmost disk of the stack formation to the arm or annular member 74 then positioned over the stack and the plate 66 then rotated to position the selected disk over the container 20 on the container support. The container support is then elevated, moving the top of the container through the aperture 73, removing the disk from the annular member 74 and upon further upward movement of the container the same is moved into a sealing member which secures the disk to the top of the container.

The containers particularly referred to herein consist of an outer fibrous casing formed of paper-board, or like material, into which a liner bag of thin, flexible material, such as Cellophane, is inserted and the open end of the bag folded outwardly over the upper edge of the casing. Such containers are particularly desirable for use in connection with products or commodities requiring a light weight, liquid and/or gas tight, receptacle. Frequently, it is desirable that these containers be closed and sealed with Cellophane. By using a Cellophane closure, the advantages of the Cellophane liner bag are retained and the transparency of the closure affords a ready means of the customer examining the contents of the container without breaking the seal thereof.

To those familiar with the handling of Cellophane, it will be appreciated that considerable difficulty is encountered in handling individual sheets or disks of Cellophane, particularly by any automatic mechanism or machine. Generally, the Cellophane closure disks are formed by cutting a plurality of such disks from a stack of Cellophane sheets with a hollow circular knife. This method of cutting has a tendency to compress the disks tightly together and to partially roll or bend the peripheral edges of the disks into overlapping relationship. This in addition to the fact that the Cellophane sheets are extremely thin, flexible and smooth, make it extremely difficult to separate one sheet from a plurality

of disks arranged in stack formation. However, I have devised a mechanism for accomplishing this result and which mechanism I find functions with great efficiency. The top sheet of the disk formation 56 is frictionally secured to the annular member 74 by means of vacuum. However, I have found that it is difficult, if not impossible, to separate the top disk of the stack formation by vacuum. I have also found that it is not possible to do this by preliminarily using any of the conventional forms of sheet buckling devices. It will be understood that the surface of the Cellophane is extremely smooth and slippery, and that the inherent characteristics of the sheet are entirely different from that of paper or other sheet material.

The mechanism I employ for preliminarily separating the top sheet from the stack formation consists generally of a pair of friction pads arranged in spaced apart relationship and means operable to move these pads into engagement with the topmost disk of the stack and to effect a spreading action of the pads during such engagement. More specifically this mechanism, as here shown, includes a semi-elliptical spring member 76, to the ends of which are secured friction pads 77 of rubber or like material. The spring member 76 is secured intermediate its ends to a rod 78 extending upwardly and adjustably secured to one end of a cross member 79, the opposite end of which is adjustably secured to a rod 80 extending downwardly through a guide sleeve 81 carried by the frame of the machine. The lower end of the rod 80 is attached to a helical tension spring 82, the lower end of which is attached to the base plate 10. Accordingly, the rods 78, 80 are yieldingly urged downwardly. A lever 83 is pivotally mounted at one end in a post 84 extending from the base plate 10 to the top plate 12. The opposite end of the lever 83 is pivotally connected to the lower end of rod 80, as at 85. Intermediate its ends, the lever 83 is provided with a follower roller 86 engaging the surface of a cam 87. Upon rotation of the shaft 28, the lever 83 is moved upwardly and effects upward movement of rods 78, 80 to position the pads 77 above the member 66, see Figure 5. When the follower roller 86 engages the low portion of cam 87, the rods 78, 80 are moved downwardly by spring 82, bringing the pads 77 into engagement with the disks of the stack formation and under the tension of spring 82. The tension of spring 82 is sufficient to cause a flexing of the spring member 76 which, in turn, causes a spreading movement of the pads 77.

In conventional sheet buckling mechanisms, one or more friction pads are used. However, these pads are moved toward each other to buckle up the intervening portion of the sheet, or one pad is used in connection with a stationary member. Due to the characteristics of the Cellophane sheet, I have found that such mechanisms will not operate on this material. However, I find that the spreading movement of the pads 77 causes opposite sides of the top disk to curl upwardly as indicated at 89, Figure 4. This permits air to enter under each side of the disk and after the pads 77 are elevated out of engagement with the stack formation, the topmost disk remains preliminarily separated from the stack formation, and the vacuum means connected with the transfer plate 66 is then operable to secure this separated disk to the transfer plate or annular member 74.

The vertical movement of the spring 76 and pads 77 is through the aperture 73 in plate 66. That is, the operating mechanism of the machine,

to be hereinafter described, is such that during the vertical movement of the spring 76 the transfer plate member 66 is stationary. Subsequently, the shaft 58 is elevated to bring the stack into engagement with annular member 74, as illustrated in Figure 3. This upward movement of the shaft 58 is under tension of spring 90, the lower end of which is secured to the rod 58 and the upper end to the under side of the deck plate 12. Downward movement of the shaft 58 is positive, and is effected by a cam 91 also mounted on shaft 28, the periphery of which engages a roller 92 mounted intermediate the ends of a lever 93. One end of the lever 93 is pivoted on a pin 94 carried by a short post 95 mounted on the base plate 10. The opposite end of the lever 93 is pivotally connected to shaft 58. The cams 87, 91 are so arranged on shaft 28 as to effect the buckling operation, or the preliminary separation of the topmost sheet from the stack, and subsequently to elevate the stack into engagement with the annular member 74. The spring 90 compensates for the movement of shaft 58 as the sheets are transferred out of the stack formation 56. The cup member 59 is pressed into engagement with the under side of the plate 66 by spring 62.

The upper side of annular member 74 is formed with an annular recess 98, and the annular member 74 is formed with a plurality of small holes or apertures 99 extending from the under side of said member to the annular recess 98. The plate member 66 is formed with passages 100, the outer ends of which communicate with the annular recess 98, and the inner ends communicate with an axially extending passage 101 formed in the hub portion 67. It is to be understood that the outer end of each arm of the plate 66 is provided with an aperture 73, an annular member 74 and passages 100, 101. The hub member 67 and the sleeve 69 are formed with passages 102 extending radially inwardly and communicate with an arcuate groove 103 formed in the tubular member 71 intermediate its ends. This member is also formed with an axially extending passage 104 extending downwardly from the arcuate groove 103 and opening through the bottom end of said member and to which a conduit 106 is connected and which extends from a vacuum pump 107 operatively connected to the motor 22.

The semi-arcuate passage 103 is so arranged that vacuum is produced in the apertures 99 of both annular members 74 while plate 66 is stationary in the position shown in Figures 1 and 3, but during rotation of plate 66, vacuum is supplied only to the annular member moving from the stack 56 to the container on the container support 51.

As previously stated, the rotary movement of plate 66 is intermittent. Any suitable mechanical movement may be employed to effect the intermittent movement of the transfer plate 66. As here shown, this movement is effected by a Geneva motion consisting of the conventional driving member 110 and driven member 111 to which a gear 112 is secured, as by screws 113. The gear 112 is arranged to mesh with the gear 70 on the bottom of sleeve 67. The driving member 110 is secured to the upper end of a vertically arranged shaft 114 journaled in a bearing member 115 depending from the under side of the top plate 12. A beveled gear 116 is secured to the lower end of the shaft 114 and meshes with a similar gear 117 secured to the shaft 28. The gears between the shaft 28 and sleeve 67, and the Geneva motion, are so proportioned and arranged as to effect

Intermittent movement of the transfer plate 66 at the proper time relative to the operation of the other movable members of the machine previously referred to.

Upon rotation of the transfer plate 66 through an arc of 180° the disk, frictionally secured thereto by the vacuum system previously described, is transferred to a position over the top of the container 20 resting upon the support 51. While the movable parts of the machine are in this position, the container support 51 is elevated or moved axially toward the end of the transfer plate 66 causing the upper end of the container to pass through the aperture 73 and remove the closure disk from the member 74 and fold the peripheral margin of the disk downwardly about the upper edge of the container. The upward movement of the rod 52 is effected by a lever 118 pivoted at one end to a short post 119 on the base plate 10 and connected at its opposite end to the rod 52. A helical tension spring 120 is connected at its upper end to the under side of plate 12 and at its lower end to the lever 118.

The lever 118 is provided with a follower roller 121 arranged to engage the periphery of a cam 122 mounted on the shaft 26. The lever 118 is urged upwardly by spring 120 and is moved downwardly by cam 122.

The sealing of the peripheral margin of the closure disk to the top of the container is preferably accomplished by use of a suitable adhesive which has been previously applied to the overlapping portion of the liner bag, or on the peripheral surface of the top of the container. As previously stated, the peripheral margin of the closure disk is folded downwardly about the peripheral surface of the top of the container as the same is moved upwardly through the aperture 73 and transfer member 66. When the adhesive used is of the thermo-plastic type, or for any other reason it is desired to apply heat to the closure disk, the machine is provided with a sealing head or member arranged above the transfer member 66 and in axial alignment with the container support 51.

The sealing head is secured to and carried by a bracket 130 which, in turn, is secured to a sleeve 131 which, in turn, is adjustably secured to the tubular member 71, this adjustment being effected by manipulation of the screw 132, see Figures 1 and 3.

The sealing head proper consists of a plurality of sections or quadrants 133 having depending arcuate flanges 134, the lower inner surfaces of which are beveled as at 135, and the upper side of the members are likewise beveled as at 136. The arcuate members 133 are mounted between upper and lower plates 137, 138, and these plates are secured together by screws 139. The members 133 are slidably mounted between the plates 137, 138, and are formed with radially extending projections 140 which extend outwardly through slots arranged in the plates 137 and 138, and the arrangement is such that the members 133 have a radially sliding movement relative to the plates 137, 138. The members 133 are normally maintained in inward or contracted position by means of a coiled spring 141 secured at its ends to plates 137, 138 by means of brackets 143, and which spring encircles the periphery of the plates and engages the outer ends of the projections 140, see Figure 8. The plates 137, 138 are secured to the bracket 130 by studs 145.

After the topmost disk of the stack formation 56 has been transferred to a position over the

container on the container support 51, and the container support has been moved upwardly moving the top of the container through the aperture 73 of the transfer member 66 and thereby removing the disk from the transfer member, further upward movement of the container support 51 moves the top of the container into the arcuate members 133. The members 133, through the action of spring 141, yieldingly iron or press the peripheral margin 125 of the closure disk against the outer surface of the top of the container, or the overfolded portion of the liner bag, see Figure 9, and to aid in the completion of the seal between the closure disk and the container or bag the segments 133 are heated by heating coils 148 arranged in the plates 137, 138. The heating coils 148 are energized by conductors 149 connected to a suitable source of current. At this time, the container support 51 has moved downwardly to the position shown in Figure 3, so that the bottom of the container is supported upon the rails 55 and the projections 54 are arranged beneath the bottom of the container.

The sealed container is then moved forwardly onto the deck plate 12 by a pusher member 160 secured to a shaft 161 slidably mounted in bearings 162 and which is reciprocated by a bar 163 pivotally mounted at its lower end at 164, see Figures 2 and 3, and which is provided with a cam follower 165 cooperable with a cam 166. The bar 163 and the pusher member 160 are moved forwardly by spring 167, and these members are returned to normal position, see Figures 1 and 2, by action of cam 166. As here shown, the deck plate is provided with an arcuate guide member 168 which directs the sealed containers 169 onto the conveyor belt 15 and the angular guide member 170 in turn directs the sealed containers to the available storage space on deck plate 12 from whence they may be removed to the packing case.

In order to insure downward movement of the container out of the sealing head and downwardly through apertures 73 in the transfer plate, the machine is provided with a presser plate 150 mounted on the lower end of a rod 151, the upper end of which is adjustably secured to one end of a transversely extending member 152, the opposite end being adjustably secured to a vertically arranged shaft 153 slidably mounted in the tubular member 71. The shaft 153 is urged upwardly by spring 154, the upper end of the spring being secured to the under side of the deck plate 12, and the opposite end to the lower end of the shaft 153. The shaft is moved downwardly by action of a cam 155 secured to the shaft 28, and which is cooperable with a link 156 arranged in the same manner as the links 93, 118 previously referred to. The cam 155 is arranged on shaft 28 to effect downward movement of the presser plate 150 until the top of the sealed container is positioned below the transfer plate 66, whereupon the presser plate is returned to its up position, see Figure 7.

In order to prevent the possibility of the adhesive or any spilled contents of the container from sticking to and accumulating upon the segments 133 of the sealing head, I form the presser plate 150 with one or more circumferential grooves 171 and the lower end of the presser plate 150 is provided with a radially extending flange 172, the top and bottom edges of which are beveled to conveniently effect the opening or outward movement of the segments 133 upon re-

displacement of the presser plate 150. This expansion of the sealing head or members 133 permits the sealed container to readily move downwardly with the downward movement of the container support 51. As the presser plate 150 travels downwardly through the segments 133 and flange 172 passes out of the sealing head, the members 133 contract and any accumulation of adhesive or other material is removed by the grooves 171, thus permitting the machine to be operated over long periods of time without the necessity of stopping the same except for the replacement of the disk stack formation 56. However, inasmuch as the Cellophane disks are extremely thin, a stack formation containing several hundred disks may be inserted in the cup member 59 at one time. In connection with cup member 59, I call attention to the fact that the disk 57 which supports the stack formation is secured to the upper end of shaft 58 in such manner as to have a slight universal movement relative thereto, see Figures 4 and 5. This permits the stack to properly face with the lower edge of annular member 74 when rod 58 is elevated and accordingly, permits the vacuum system to operate efficiently in securing the topmost disk to the transfer member.

I also desire to call attention to the fact that the machine may be quickly and conveniently adjusted to accommodate containers of different heights, this being accomplished by adjusting shaft 151 axially relative to shaft 153, and in adjusting member 131 to which the supporting bracket 130 for the sealing head is secured axially of tubular member 71, the maximum height of the container being controlled by the distance from the bottom of the transfer member 66 to deck plate 12.

What I claim is:

1. A machine for applying closure disks of thin, flexible material to containers comprising a frame, a movable member arranged to support a plurality of disks in stack formation, an annular member, a container support arranged to support the container in axial alignment with said annular member, a transfer member movably mounted on the frame and operable to transfer the disks from said stack formation to a position over the top of the container on the container support, means operable to preliminarily separate the topmost disk from the stack, means subsequently operable to move said movable member to bring the top of the stack into engagement with said transfer member, vacuum means connected to said transfer member and operable to secure said topmost disk to the transfer member, means operable to move said transfer member to position the disk over the top of the container, and means for moving said container support toward said annular member to move the top of the container with the disk thereon into said annular member, and said member being operable to secure the peripheral edge of the disk to the container.
2. A machine for applying closure disks of thin, flexible material to containers comprising a frame, a stack support slidably mounted in the frame and arranged to support a plurality of said disks in stack formation, a cylindrical member encircling the stack formation and being yieldingly movable relatively thereto, an annular member mounted on the frame, a container support arranged to position a container in axial alignment with said annular member, a transfer member journaled on the frame and being provided with

a radially extending arm, the outer end of which is movable from a position over said stack formation to a position over the container on the container support, means operable to move said cylinder and the top of the stack into engagement with said arm, and vacuum means connected to said arm and operable to secure the topmost disk of said stack to the arm, means operable subsequently to effect movement of said arm to position said disk over the top of the container, means for moving the container support axially toward said annular member to move the top of the container and said disk into the annular member, and said annular member being operable to secure the peripheral margin of the disk to the container.

3. A machine for applying closure disks of thin, flexible material to containers comprising a frame, a stack support slidably mounted in the frame and arranged to support a plurality of disks in stack formation, a sealing member, a container support arranged to support the container in axial alignment with said sealing member, a transfer member journaled on the frame and being provided with a plurality of radially extending arms successively movable from a position over the top of the stack formation to a position over the top of the container on the container support, means operable to preliminarily separate the topmost disk from the stack, and means subsequently operable to move said stack support to bring the top of the stack into engagement with the arm of the transfer member positioned over the stack, said arm being provided with means for securing the topmost disk of the stack to the arms upon engagement of the stack with the arms, means operable to move said transfer member to position the arm with the disk secured thereto over the top of the container, means for moving said container support towards said sealing member to bring the top of the container with the disk thereon into engagement with said member, and said member being operable to seal the peripheral edge of the disk to the container.

4. A machine for applying closure disks of thin, flexible material to containers comprising a suitable frame, a container support, a closure sealing head arranged above said container support, a presser plate positioned above said sealing head, said container support, sealing head, and presser plate being arranged in axial alignment, and means for suspending a closure disk between the top of a container on said support and said sealing head, including an annular series of radially movable segmental members operable, upon relative axial movement between the container support and said sealing head, to yieldingly press the margin of the closure disk against the top of the container, said presser plate being operable, upon axial movement relative to said sealing head and during reverse movement between said container support and the sealing head, to expand said segmental members and move the container out of said sealing head.

5. A machine for applying closure disks of thin, flexible material to containers comprising a suitable frame, a container support, a closure sealing head arranged above said container support, a presser plate positioned above said sealing head, said container support, sealing head, and presser plate being arranged in axial alignment, and means for suspending a closure disk between the top of a container on said container support and said sealing head, said sealing head including an

annular series of radially movable segmental members operable, upon relative axial movement between the container support and said sealing head, to yieldingly press the margin of the closure disk against the top of the container, means operable to move said presser plate into said sealing head during reverse relative movement between the container support and said head, said presser plate being operable to expand said segmental members and to move the container out of the head, and said presser plate being operable during the return movement thereof to remove any foreign matter from the face of said segmental members.

6. A machine for applying closure disks of thin flexible material to the tops of containers comprising a suitable frame, a container support arranged in the frame and being movable vertically, a plate arranged above said container support and being operable to suspend a closure disk over the top of a container on said support, a sealing head positioned above said plate and including a plurality of radially movable segmental members, and means for heating said members, said members being operable, upon movement of the container support upwardly, to yieldingly press the margin of the closure disk against the top of the container, a presser plate normally positioned above said sealing head and being movable downwardly through said head, said presser plate being operable, upon downward movement, to expand said segmental members and move the top of the container out of the same, the upper portion of said plate being of cylindrical formation and being provided with a circumferential groove and being operable to remove any foreign material from the face of said segmental members upon the return movement of the presser plate.

7. A machine for applying closure disks of thin, flexible material to the tops of containers comprising a frame, a cup-shaped member, a plate arranged to support a plurality of closure disks in stack formation in said cup member, a container support, a closure sealing head arranged above the container support and being operable, upon relative axial movement between the container support and said head, to secure a closure to the container, a transfer member movably mounted on the frame, and means for positioning said transfer member over said cup member, means operable to move said cup member vertically into engagement with the under side

of said transfer member, and to subsequently move said plate to bring the top of said stack formation into engagement with the under side of said plate, vacuum means connected to said transfer member and operable to secure the topmost disk of said stack formation to the transfer member, means operable to subsequently move said stack formation and said cup downwardly from said transfer member, and to move the latter to position the disk over the top of the container on said support, and means for moving said container support towards said sealing head to move the top of the container with the disk thereon into said head, and to subsequently remove the container from the head.

8. A machine for applying disk closures formed of thin, flexible material to containers comprising a suitable frame, an annular member formed with an aperture to slidably receive the top of the container, a container support arranged to position the container in axial alinement with said annular member, a tubular member arranged to support a plurality of said disks in stack formation, a transfer member journaled in the frame and having a radially extending arm portion provided with an aperture at its outer end arranged in axial alinement with said stack formation and being movable to a position in axial alinement with said container, a support arranged above said stack formation, a pair of friction pads secured to the lower end of said support and arranged in spaced apart relationship, said support being normally arranged to position said friction pads in alinement with the aperture in said arm and above the same, means operable to move said support downwardly to move said pads through the aperture of the arm and into engagement with the top of the stack and to effect a yielding spreading action of said pads during such engagement, and to subsequently move said support upwardly to normal position, means operable to elevate said stack support to move the stack into engagement with said arm, said arm being provided with vacuum means to frictionally secure the topmost disk to the arm, means operable subsequently to move said arm to position the disk over the container, and means operable to move the container support towards said annular member to bring the top of the container with the disk thereon into engagement with said annular member.

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